

AMENDED CLAIMS IN CLEAN FORM

1. (currently amended) A fiber optic gyroscope comprising:

- a light source;
- an optical fiber;
- an optical fiber coupler;
- a substrate-based optical integrated circuit;
- a single mode fiber optic coil; and
- a light receiver;

wherein a light beam from the light source passes through the optical fiber and the optical fiber coupler to the substrate-based optical integrated circuit;

wherein the optical integrated circuit serves as a polarizer and a branching optical waveguide for branching the light beam into two beams that are incident on opposite ends of the single mode fiber optic coil;

wherein the two beams pass through the single mode fiber optic coil as a clockwise rotating beam and a counter-clockwise rotating beam and are coupled together in the optical integrated circuit to produce an interference beam;

wherein the interference beam passes through the optical fiber coupler to the light receiver;
and

wherein the light receiver converts intensity of the interference beam into an electrical signal for detecting an angular rate applied to the fiber optic coil about the axis thereof;
the fiber optic gyroscope further comprising:

- a first polarization maintaining optical fiber connected between the optical fiber coupler and the optical waveguide of the optical integrated circuit such that light passing from the first polarization maintaining fiber is directly incident on the optical integrated circuit, wherein the first polarization maintaining optical fiber has a polarization axis coincident with the direction of the TE mode in the optical waveguide, the first optical fiber having a length L_1 ;

a second and a third polarization maintaining optical fiber connected to end faces of the optical waveguide of the optical integrated circuit, where the polarization axes of the second and third polarization maintaining optical fiber are coincident with the direction of the TE mode in the optical waveguide, the second and the third optical fiber having a length of L2 and L4, respectively;

and a fourth and a fifth polarization maintaining optical fiber having one end connected to the second and the third polarization maintaining optical fiber, respectively, where relative polarization axes of connected optical fibers are displaced by an angle of 45°, the fourth and the fifth optical fiber having another end connected to the opposite ends of the fiber optic coil, the fourth and the fifth optical fiber having a respective length of L3 and L5;

wherein L denotes a length required to produce a group delay time difference between orthogonal polarizations in each of the polarization maintaining optical fibers which is in excess of the coherence length of a light beam from the light source, the fiber lengths satisfy the following:

$$\begin{aligned} L1 &\geq L, \quad L3 \geq L, \quad L5 \geq L \\ |(L1+L2)-L3| &\geq L, \quad |(L1+L4)-L5| \geq L \\ ||(L1+L2)-L3| - |(L1+L4)-L5|| &\geq L. \end{aligned}$$

2. (currently amended) A fiber optic gyroscope according to Claim 1, wherein:

$$\begin{aligned} |L1-L3| &\geq L, \quad |L1-L5| \geq L \\ ||L1-L3| - |L1-L5|| &\geq L. \end{aligned}$$

3. (currently amended) A fiber optic gyroscope according to Claim 1, wherein:

$$\begin{aligned} L2 &\geq L, \quad L4 \geq L, \\ ||L1-L2|-L3| &\geq L \\ ||L1-L4|-L5| &\geq L \\ |||L1-L2|-L3| - ||L1-L4|-L5|| &\geq L. \end{aligned}$$

4. (currently amended) A fiber optic gyroscope according to Claim 3, wherein:

$$L2 \geq 2L, \quad L3 \geq 4L, \quad L4 \geq 8L, \quad L5 \geq 16L.$$

5. (currently amended) A fiber optic gyroscope comprising:

- a light source;
- a first polarization maintaining optical fiber;
- a polarization maintaining optical fiber coupler;
- a substrate-based optical integrated circuit;
- a single mode fiber optic coil; and
- a light receiver;

wherein a light beam from the light source passes through the first polarization maintaining optical fiber and the polarization maintaining optical fiber coupler to the substrate-based optical integrated circuit

wherein the optical integrated circuit serves as a polarizer and a branching optical waveguide for branching the light beam into two beams that are incident on opposite ends of the single mode fiber optic coil;

wherein the two beams pass through the single mode fiber optic coil as a clockwise rotating beam and a counter-clockwise rotating beam and are coupled together in the optical integrated circuit to produce an interference beam;

wherein the interference beam passes through the optical fiber coupler into the light receiver; and

wherein the light receiver converts intensity of the interference beam into an electrical signal for detecting an angular rate applied to the fiber optic coil about the axis thereof;
the fiber optic gyroscope further comprising:

a second and a third polarization maintaining optical fiber connected to end faces of the optical waveguide of the optical integrated circuit where the polarization axes of the second and the third optical fiber are coincident with the direction of the TE mode of the optical waveguide, the second and the third optical fiber having a respective length of L2 and L4;

and a fourth and a fifth polarization maintaining optical fiber having one end connected to the second and the third polarization maintaining optical fiber, respectively, where relative polarization axes of connected optical fibers are displaced by an angle of 45°, the fourth and the fifth optical fiber having another end connected to the opposite ends of the fiber optic coil, the fourth and the fifth optical fiber having a respective length of L3 and L5;

wherein L denotes a length required to produce a group delay time difference between orthogonal polarizations in each polarization maintaining optical fiber which is in excess of the coherence length of a light beam from the light source, the fiber lengths satisfy the following:

$$L_3 \geq L, L_5 \geq L, |L_3 - L_5| \geq L.$$

6. (currently amended) A fiber optic gyroscope according to Claim 5, wherein;

$$|L_2 - L_3| \geq L, |L_4 - L_5| \geq L$$

$$||L_2 - L_3| - |L_4 - L_5|| \geq L.$$